EMPIRICAL STUDY OF PSYCHOTIC DISORDER PATIENTS IN NIGERIA

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Abstract: A study on psychotic disorder ailment was carried out in this research paper where the target population consists of all patients that has any of the following five psychotic disorders: Menial Brain Dysfunction (MBD); Schizophrenia; Vascular Dementia; Bipolar; and Insomnia. The sample consist of five hundred (500) psychotic patients that were selected from the entire number of psychotic patients in the hospital records (files) from January, 2010 to December, 2014. They were selected based on their peculiar ailments with symptoms of psychotic disorders. The main aim of this paper is to examine the possible existence of association among these psychotic disorders. The specific objectives are to: determine the demographic factors that influence the levels of each of these psychotic disorders; propose appropriate model for each psychotic disorder; and determine the level of correct classification using each of these models. We observed that there exist strong association among these psychotic disorders except for MBD and Vascular Demetria. Nearly all the demographic factors under consideration are one way or the other influence the levels of any psychotic disorder except divorce, injury, and genetic. The percentages of correct classification using each of the models proposed ranges between 70.8% and 91.2%.

Keywords: Bipolar, empirical, insomnia, psychotic disorder, Schizophrenia, vascular dementia

Introduction

Psychotic disorders are severe mental disorders that cause abnormal thinking and perceptions. It causes people to lose touch with reality. A person with a psychotic disorder has trouble telling the difference between what is real and what is imagined. The main symptoms of psychotic disorders are delusions and hallucinations. Delusions are false beliefs, such as thinking that someone is plotting against you or that the television is sending you secret messages. A person with a psychotic disorder may believe that these fantasies are true, even when proof is given that they are not. Hallucinations are false perceptions, such as hearing, seeing or feeling something that is not there. A person experiencing a hallucination is unlikely to recognize that it is not real (Devillieres *et al*., 1996; Pillmann and Marneros, 2004; Lesser *et al*., 2006; Smith, 2010; Kane *et al*., 2010; Stafford, 2013; Jeronimus, 2016; Mizrahi, 2016).

There are several types of psychotic disorders that can cause delusions and hallucinations, these include: MBD, Schizophrenia, Bipolar, Insomnia, Vascular Demetria and so on (Ohayon *et al*., 1996).

Menial brain dysfunction (MBD) is a psychotic disorder that is caused by abuse of toxic substance like alcohol, caffeine, cocaine and amphetamines, hallucinogens, nicotine, opioids, sedatives, and other drug induced substance. Evidence increasingly suggests that both alcohol and tobacco may act on the mesolimbic dopamine system, a part of the brain that is involved in reward, emotion, memory, and cognition (Chan-Ob and Boonyanaruthee, 1999; Curran *et al*., 2004; Food and Drug, 2004; Hartling *et al*., 2012).

Schizophrenia is an illness that causes changes in behavior, delusions and hallucinations. It lasts longer than six months and often causes problems with work, school, and social functioning. This is false perception of somebody or something that is not there, which is often a symptom of a psychiatric disorder or a response to some drug. Something that somebody imagines seeing, hearing, or otherwise sensing when it is not present or occurring at the time. A persistent false belief held in the face of strong contradictory evidence, especially as a symptom of a psychiatric condition (Devillieres *et al*., 1996; Lesser *et al*., 2006, Schultz, 2007, Nordqvist, 2010; Smith, 2010; Kane *et al*., 2010; Barry *et al*., 2012).

Bipolar disorder, also known as manic-depressive illness, is a brain disorder that causes unusual shifts in mood, energy, activity levels, and the ability to carry out daily tasks. Bipolar disorder symptoms can result in damaged relationships, poor job or school performance, and even suicide. But bipolar disorder can be treated, and people with this illness can live full and productive lives. People with bipolar disorder experience intense emotional states that occur in distinct periods called mood episodes. Each mood episode represents a drastic change from a person's usual mood and behavior. An overly joyful or overexcited state is called a manic episode, and an extremely sad or hopeless state is called a depressive episode. Sometimes, a mood episode includes symptoms of both mania and depression. This is called a mixed state. People with bipolar disorder also may be explosive and irritable during a mood episode. Extreme changes in energy, activity, sleep, and behavior go along with these changes in mood (Sharma and Dwight, 2003; Pillmann and Marneros, 2004; Jeronimus, 2016).

Insomnia is a sleep disorder that is characterized by difficulty of staying asleep. Difficulty in falling asleep, waking up often during the night and having trouble going back to sleep, waking up too early in the morning or feeling tired upon waking. The causes of insomnia are: life stress (job loss or change, death of a loved one, divorce), illness, emotional or physical discomfort, environmental factors like noise, light, or extreme temperatures (hot or cold) that interfere with sleep, some medications (for example those used to treat colds, allergies, depression, high blood pressure and asthma) may interfere with sleep or interferences in normal sleep schedule (switching from a day to night shift) (Devillieres *et al*., 1996; Sharma and Dwight, 2003).

Vascular dementia refers to a progressive decline in memory and cognitive functioning caused by a blockage or reduction in the blood flow to the brain. When the blood supply to the brain is interrupted, brain cells are deprived of vital oxygen and nutrients, causing damage to the cortex of the brain-the

area associated with learning, memory, and language. The risk factors are increasing in age, having high blood pressure, high cholesterol and atherosclerosis which may occurs when deposits of cholesterol or plaques build up in the arteries and narrow blood vessels, reducing blood flow to the brain (Lesser *et al*., 2006; Taylor *et al*., 2000; Kane *et al*., 2010).

The main aim of this paper is to examine whether associations exist among the psychotic disorder factors. The specific objectives are to determine the factors that influence the levels of each of these psychotic disorder factors, propose model for each of the psychotic disorders and determine the percentage of correctly classified as having such disorder using any of these proposed models.

Logistic Regression model was used as a tool for examining the demographic factors under consideration to identify factors that influence the levels of each of the psychotic disorders. Many authors have worked with logistic regression model in addressing response variables that are categorical in nature (Hosmer, 1997; Strano and Colosimo, 2006; Vittinghoff and McCulloch, 2007; Tjur, 2009; Palei and Das, 2009).

The data used for this paper was a secondary data collected from the records of Neuro-Psychiatric Hospital Yaba, Lagos, for a period of five years, starting from year 2010 to 2014. Records on demographics data, like age, sex, family status, religion, occupation, genetics, marital status, loss of parent, injury, spiritual consult, and on some psychotic disorders, such as, MBD, schizophrenia, vascular dementia, bipolar and Insomnia, were collected from each of the 500 psychotic disorder patients.

Methodology

We want to predict the psychotic disorderof any patient from a knowledge of relevant independent variables (mainly demographic factors) and coefficients of the probability (p) that Y=1 (for been tested positive for a psychotic disorder) rather than the probability that Y = 0 (for been tested negative). The outcome variable is not a prediction of a Y-value, as in linear regression, but a probability of belonging to one of the two conditions of Y.

A further mathematical transformation (a log transformation) is needed to normalize the distribution. This log transformation of the probability values to a log distribution enables to create a link with the normal regression equation. The log distribution (or the logistic transformation of p) is also known as the logit of p or logit(p). A complex formula is required to convert back and forth from the logistic equation to the Ordinary Least Square (OLS) type equation. The logistic formulaeis stated in terms of the

$$p(y=1)=p \quad and \quad p(y=0)=1-p \tag{1}$$

Unfortunately, a further mathematical transformation is needed to normalize thedistribution. Logit(p) is the log (to base e) of the odds ratio or likelihood ratio that the dependent variable is 1. In symbols, it is defined as:

$$\log it(p)=\log\left(\frac{p}{1-p}\right) \tag{2}$$

The form of the logistic regression equation is:

$$\log it(p(x))=\log\left(\frac{p(x)}{1-p(x)}\right) \text{ and}$$

$$p(x)=\frac{\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)} \tag{3}$$

$$1-p(x)=1-\frac{\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)} \tag{4}$$

$$=\frac{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)-\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)} \tag{5}$$

$$=\frac{1}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)} \tag{6}$$

$$\frac{p(x)}{1-p(x)}=\frac{\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}\div\frac{1}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)} \tag{7}$$

$$=\frac{\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}\times\frac{1+\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p)}{1} \tag{8}$$

$$\therefore\frac{p(x)}{1-p(x)}=\exp(\beta_0+\beta_1x_1+\beta_2x_2+\ldots+\beta_px_p) \tag{9}$$

where:

$p(x)$ = the probability that a case is in a specific category,

β_0 = the constant of the equation or intercept and

β_i = the coefficient of the predictor variable x_i.

Thus, logistics regression involves fitting an equation of the form;

$$\log it(p(x) = \log\left(\frac{p(x)}{1-p(x)}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p \quad (10)$$

Note that $p(x)$ can only ranges from 0 to 1, *logit(* $p(x)$ *)* scale ranges from negative infinity to positive infinity and is symmetrical around the logit of 0.5 (which is zero).

As a generalized linear model (GLM) the particular model used by logistic regression, which distinguishes it from standard linear regression and from other types of regression analysis used for binary-valued outcomes, is the way the probability of a particular outcome is linked to the linear predictor function.

$$\log it\left[E(Y_i / X_i\right] = \log it(p(x_i) = \log\left(\frac{p(x_i)}{1-p(x_i)}\right) = \mathrm{B}^T X \quad (11)$$

The GLM procedure would be used to fit the model. Poisson sampling is mostly assumed when fitting GLM to categorical data with number of explanatory variables above two(p>2). The log likelihood function is

$$l(\theta,\varphi) = \sum_{i=1}^{n}\left(\frac{y_i\theta_i - b(\theta_i)}{\varphi} + c(y_i,\varphi)\right) \quad (12)$$

where θ subsumes all the θ_i. It could be written as function of β and Φ because (given the x_i), β determines all the θ_i.The main way of maximizing β is by maximizing (12)

As stated in equation (11), $G(y_i) = \pi(x_i) = x_i\beta$ suggest a crude approximation estimate: regress $G(y_i) = \pi(x_i)$ on x_i, perhaps modifying y_i in order to avoid violating range restrictions (such as taking log (0)), and accounting for the differing variances of the observations.

The Fisher scoring iteration is the widely used technique for maximizing the GLM likelihood over β. The basic step is

$$\beta^{(k+1)} = \beta^k - (E(\frac{\partial^2 l}{\partial\beta\partial\beta'}))^{-1}\frac{\partial l}{\partial\beta} \quad (13)$$

This can also be written as

$$\beta^{(k+1)} = \beta^k + (-E(l''(\beta^{(k)})))^{-1} l'(\beta^{(k)}) \quad (14)$$

Where *l* is the log-likelihood function for the entire sample $y_1, y_2 \ldots y_N$ and the expectations are taken with $\beta = \beta^{(k)}$.

Fisher scoring simplifies to

$$\beta^{(k+1)} = (X'WX)' X'WZ$$

Where *w* is a diagonal matrix with

$$W_{ii} = (G'(\mu_i)^2 b''(\theta_i))^{-1} \quad (15)$$

And $Z_i = (Y_i - \mu_i)G'(\mu_i) + x_i\beta$ (16)

Both equations (15) and (16) use $\beta = \beta^{(k)}$ and derived values of $\theta_i^{(k)}$ and $\mu_i^{(k)}$.

The hypothesis to be tested for each of the psychotic disorder models is

H_0 : $\beta_1 = \beta_2 = \ldots = \beta_\kappa$ vs. H_1: Not H_0 $\propto = 0.05$

Decision Rule: Reject H_0 if the p-value of the coefficient of any of the demographic factors is less than or equal to the value of $\propto = 0.05$, otherwise accept H_0.

Results and Discussions

From Appendices1 to 16 in the Appendix, out of the 500 psychotic patients under consideration, 42.8% are of mid age between 30 and 60 years while 36.2% were mainly youth below 30 years. 53.4% were female and 53.8% had history of psychotic disorder in their family. Both Christianity and Islam religions had 44% each, for occupation, Artisans had the highest of 28.8% followed by students with 24% and unemployed youth with 19.2%. 56.2% of them were married, 59.6% had lost their parents early, only 12% were already divorced, 18.8% had head injuries in the past and 69.4% had consultation with spiritualists. Lastly, 40.6% were tested positive to insomnia, 85% to schizophrenia, 69.2% to Vascular Demetria, 43.6% to MBD and 40.2% to Bipolar.

Model 1: Final Model for MBD

$$Logit(p_{MBD}) = -1.471(sex_F) - 0.686(occupation_{Artesan}) + 2.284(age_{below30}) + 1.776(age_{30-60})$$

From Appendices17 and 18, the likelihood Ratio (chi-square) statistic is reported as 128.552 with 7 degrees of freedom and a p-value of 0.0001. So, we conclude that there exists an overall relationship between the response variable and the independent variables. This implies that MBD psychotic disorder is influenced by gender, occupation, and age of the patients.

The percentage of correctly classified as Positive or Negative by the above model using the observed and the predicted frequencies is 70.8% for MBD.

Model 2: Final Model for Bipolar

$$Logit(p_{Bipolar}) = 0.862 + 0.563(status_M) + 0.504(lop_P) - 0.592(SC_P) - 2.249(age_{below30}) - 1.907(age_{30-60})$$

From Appendices19and 20, the likelihood Ratio (chi-square) statistic is reported as 108.192 with 4 degrees of freedom and a p-value of 0.0001. So, we conclude that there exists an overall relationship between the response variable and the independent variables. This implies that Bipolar psychotic disorder is influenced by marital status, Loss of parent, Spiritual consults, and age of the patients.

The percentage of correctly classified as Positive or Negative by the above model using the observed and the predicted frequencies is 71.4% for Bipolar.

Model 3: Final Model for VD

$$Logit(p_{VD}) = 3.080 - 0.509(FS_p) - 2.071(occupation_{Retire}) - 1.140(occupation_{Student}) - 2.997(SC_P)$$

From Appendices21 and 22, the likelihood Ratio (chi-square) statistic is reported as 184.624 with 7 degrees of freedom and a p-value of 0.0001. So, we conclude that there exists an overall relationship between the response variable and the independent variables. This implies that Vascular Demetria psychotic disorder is influenced by Family status, occupation and spiritual consults of the patients.

The percentage of correctly classified as Positive or Negative by the above model using the observed and the predicted frequencies is 81% for Vascular Demetria.

Model 4: Final Model for **Schizophrenia**

$$Logit(p_{Schizophreni}) = -1.502(religion_{isl}) - 2.128(occupation_{Retire}) + 3.240(age_{below30}) + 2.360(age_{30-60})$$

From Appendices23 and 24, the likelihood Ratio (chi-square) statistic is reported as 181.931 with 10 degrees of freedom and a p-value of 0.0001. So, we conclude that there exists an overall relationship between the response variable and the independent variables. This implies that Schizophrenia psychotic disorder is influenced by religion, occupation, and age of the patients.

The percentage of correctly classified as Positive or Negative by the above model using the observed and the predicted frequencies is 91.2% for Schizophrenia.

Model 5: Final Model for Insomnia

$$Logit(p_{insomniani}) = 0.883 + 0.541(status_M) + 0.454(Los_p) - 0.562(SC_p) - 2.182(age_{below30}) - 1.898(age_{30-60})$$

From Appendices25 and 26, the likelihood Ratio (chi-square) statistic is reported as 103.222 with 4 degrees of freedom and a p-value of 0.0001. So, we conclude that there exists an overall relationship between the response variable and the independent variables. This implies that insomnia psychotic disorder is influenced by marital status, loss of parent, spiritual consults, and age of the patients.

The percentage of correctly classified as Positive or Negative by the above model using the observed and the predicted frequencies is 71.6.2% for Insomnia.

Table 1: Table of association among psychotic disorders (χ^2 statistic with P-value)

Psychotic Disorders	MBD	Schizophrenia	Vascular Demetria	Bipolar	Insomnia
MBD		27.333 (p< 0.0001)*	1.440 (p= 0.230)	15.838 (p< 0.0001)*	18.637 (p< 0.0001)*
Schizophrenia	27.333 (p< 0.0001)*		8.744 (p< 0.003)*	25.711 (p< 0.0001)*	27.468 (p< 0.0001)*
Vascular Demetria	1.440 (p= 0.230)	8.744 (p< 0.003)*		3.832 (p< 0.050)*	4.309 (p< 0.038)*
Bipolar	15.838 (p< 0.0001)*	25.711 (p< 0.0001)*	3.832 (p< 0.050)*		483.559 (p< 0.0001)*
Insomnia	18.637 (p< 0.0001)*	27.468 (p< 0.0001)*	4.309 (p< 0.038)*	483.559 (p< 0.0001)*	

*Significant at α=0,05

$$H_0 : \pi_{ij} = \pi_{i.}\pi_{.j} (no \quad association) \quad \forall$$

$$H_1 : \pi_{ij} \neq \pi_{i.}\pi_{.j} (there \quad is \quad association)$$

From Table 1, all pairs of psychotic disorders are highly significant, except for MBD and Vascular Demetria which is not significant as indicated in the table. This implies that there exist strong associations among the psychotic disorders of psychotic patients under consideration. Which hence means, a psychotic patient can be infected or tested positive for more than one psychotic disorders at a specific time.

Conclusion

We observed that female had higher percentage of psychotic patients than their male counterpart. People of mid age between 30 and 60 years were mainly affected, follow by the youth that are below 30 years. In terms of occupation or profession, Artisans were mostly involved followed by students and unemployed youth. A large percentage of them were already married and some lost their parent at tender age. Schizophrenia had the largest percentage of positive among the patients under consideration while Bipolar had the least. This suggested that schizophrenia is the most common psychotic disorder.

We also observed that there exist strong association among these psychotic disorders except for MBD and Vascular Demetria. Nearly all the demographic factors under consideration are one way or the other influence the levels of any psychotic disorder except divorce, injury, and genetic that failed to influence any of them. Models were proposed for each of the psychotic disorders. The percentages of correct classification using each of the models proposed ranges between 70.8% and 91.2%. A psychotic patient can be predicted or classified of having any of these psychotic disorders correctly by testing or diagnosing them for each of those demographic factors listed in this research paper.

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APPENDICES

Appendix 1: Age distribution of psychotic patients

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 30 years	181	36.2	36.2	36.2
	30 - 60 years	214	42.8	42.8	79.0
	> 60 years	105	21.0	21.0	100.0
	Total	500	100.0	100.0	

Appendix 2 Gender distribution of psychotic patients

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	267	53.4	53.4	53.4
	Male	233	46.6	46.6	100.0
	Total	500	100.0	100.0	

Appendix 3: History of psychotic disorder in the family

Family Status		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative (No)	231	46.2	46.2	46.2
	Positive (Yes)	269	53.8	53.8	100.0
	Total	500	100.0	100.0	

Appendix 4: Religion of psychotic patients

Religion		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Christianity	222	44.4	44.4	44.4
	Islam	219	43.8	43.8	88.2
	Others	59	11.8	11.8	100.0
	Total	500	100.0	100.0	

Appendix5: Occupation of Psychotic Patients

Occupation		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ARTISAN	144	28.8	28.8	28.8
	C/SERVANT	73	14.6	14.6	43.4
	FORCE	21	4.2	4.2	47.6
	RETIRED	46	9.2	9.2	56.8
	STUDENT	120	24.0	24.0	80.8
	UNEMPLYD	96	19.2	19.2	100.0
	Total	500	100.0	100.0	

Appendix6: Record of Brain disorder in the lineage (Hereditary) of psychotic patients

Genetic		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	279	55.8	55.8	55.8
	Positive	221	44.2	44.2	100.0
	Total	500	100.0	100.0	

Appendix7: Marital Status of Psychotic Patients

Marital status		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	281	56.2	56.2	56.2
	Single	219	43.8	43.8	100.0
	Total	500	100.0	100.0	

Appendix8: Record of loss of parent by psychotic patients

Loss of parent		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	202	40.4	40.4	40.4
	Positive	298	59.6	59.6	100.0
	Total	500	100.0	100.0	

Appendix9: Record of divorce by psychotic patients

Divorce		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	440	88.0	88.0	88.0
	Positive	60	12.0	12.0	100.0
	Total	500	100.0	100.0	

Appendix 10: Record of injury on the head of psychotic patients

Injury		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	406	81.2	81.2	81.2
	Positive	94	18.8	18.8	100.0
	Total	500	100.0	100.0	

Appendix 11: Record of spiritual consultation by the psychotic patients

Spiritual consult		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	153	30.6	30.6	30.6
	Positive	347	69.4	69.4	100.0
	Total	500	100.0	100.0	

Appendix 12: Record of psychotic patients with insomnia

Insomnia		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	297	59.4	59.4	59.4
	Positive	203	40.6	40.6	100.0
	Total	500	100.0	100.0	

Appendix 13: Record of psychotic patients with schizophrenia

Schizophrenia		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	75	15.0	15.0	15.0
	Positive	425	85.0	85.0	100.0
	Total	500	100.0	100.0	

Appendix 14: Record of psychotic patients with vascular demetria

Vascular Demetria		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	154	30.8	30.8	30.8
	Positive	346	69.2	69.2	100.0
	Total	500	100.0	100.0	

Appendix 15: Record of Psychotic Patients with MBD

MBD		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	282	56.4	56.4	56.4
	Positive	218	43.6	43.6	100.0
	Total	500	100.0	100.0	

Appendix 16: Record of Psychotic Patients with Bipolar

Bipolar		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Negative	299	59.8	59.8	59.8
	Positive	201	40.2	40.2	100.0
	Total	500	100.0	100.0	

MBD as Response Variable

Appendix 17: Classification Table for MBD

	Observed		Predicted		
			MBD		Percentage Correct
			Negative	Positive	
Step 9	MBD	Negative	212	70	75.2
		Positive	76	142	65.1
	Overall Percentage				70.8

Appendix 18: Estimates of parameters for MBDas response variable

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 9[a]	sex(1)	-1.471	.212	48.164	1	.000	.230
	Occupation			11.307	5	.046	
	occupation(1)	-.686	.295	5.408	1	.020	.504
	occupation(2)	-.496	.384	1.666	1	.197	.609
	occupation(3)	.759	.556	1.864	1	.172	2.137
	occupation(4)	-.886	.729	1.478	1	.224	.412
	occupation(5)	-.402	.369	1.192	1	.275	.669
	Agecode			20.297	2	.000	
	agecode(1)	2.284	.511	19.945	1	.000	9.813
	agecode(2)	1.776	.449	15.636	1	.000	5.904
	Constant	-.788	.504	2.442	1	.118	.455

LR=128.552, df=7, Pvalue=0.00001

Bipolar as Response Variable

Appendix19: Classification Table for Bipolar

	Observed		Predicted		
			Bipolar		Percentage Correct
			Negative	Positive	
Step 8	Bipolar	Negative	254	45	84.9
		Positive	98	103	51.2
	Overall Percentage				71.4

Appendix 20: Estimates of parameters for bipolaras response variable

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 8[a]	status(1)	.563	.283	3.960	1	.047	1.755
	loss_of_parent(lop)(1)	.504	.213	5.573	1	.018	1.655
	spirirtual_consult(SC)(1)	-.592	.229	6.668	1	.010	.553
	Agecode			47.329	2	.000	
	agecode(1)	-2.249	.386	33.924	1	.000	.106
	agecode(2)	-1.907	.291	43.071	1	.000	.149
	Constant	.862	.366	5.549	1	.018	2.368

LR=108.192, df=4, Pvalue=0.00001

Vascular Demetria (VD) as Response Variable

Appendix 21: Classification Table for VD

	Observed		Predicted		
			Vascular Demetria		Percentage Correct
			Negative	Positive	
Step 9	Vascular Demetria	Negative	99	55	64.3
		Positive	40	306	88.4
	Overall Percentage				81.0

Appendix 22: Estimates of parameters for VDas response Variable

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 9[a]	family_status(1)	-.509	.246	4.287	1	.038	.601
	Occupation			19.611	5	.001	
	occupation(1)	-.651	.387	2.827	1	.093	.522
	occupation(2)	-.818	.445	3.375	1	.066	.442
	occupation(3)	-1.045	.666	2.467	1	.116	.352
	occupation(4)	-2.071	.488	17.985	1	.000	.126
	occupation(5)	-1.140	.400	8.134	1	.004	.320
	spirirtual_consult(1)	-2.997	.261	131.370	1	.000	.050
	Constant	3.080	.383	64.786	1	.000	21.764

LR=184.624, df=7, Pvalue=0.00001

Schizophrenia as Response Variable

Appendix 23: Classification Table for Schizophrenia

	Observed		Predicted		
			schizophrenia		Percentage Correct
			Negative	Positive	
Step 7	schizophrenia	Negative	43	32	57.3
		Positive	12	413	97.2
	Overall Percentage				91.2

Appendix 24: Estimates of parameters for schizophreniaas response variable

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 7[a]	fanily_status(1)	.592	.357	2.741	1	.098	1.807
	Religion			4.358	2	.113	
	religion(1)	-1.064	.781	1.855	1	.173	.345
	religion(2)	-1.502	.775	3.758	1	.050	.223
	Occupation			26.634	5	.000	
	occupation(1)	.232	.623	.139	1	.709	1.261
	occupation(2)	.760	.742	1.048	1	.306	2.138
	occupation(3)	19.704	7739.786	.000	1	.998	360966725.480
	occupation(4)	-2.128	.808	6.936	1	.008	.119
	occupation(5)	-.890	.902	.972	1	.324	.411
	divorse(1)	.776	.459	2.852	1	.091	2.173
	Agecode			22.843	2	.000	
	agecode(1)	3.240	.903	12.882	1	.000	25.546
	agecode(2)	2.360	.536	19.386	1	.000	10.592
	Constant	.666	1.054	.399	1	.528	1.946

LR=181.931, df=10, Pvalue=0.00001

Insomnia as Response Variable

Appendix 25: Classification Table for Insomnia

	Observed		Predicted		
			Insomnia		Percentage Correct
			Negative	Positive	
Step 8	Insomnia	Negative	275	22	92.6
		Positive	120	83	40.9
	Overall Percentage				71.6

Appendix 26: Estimates of parameters for insomniaas response variable

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 8[a]	status(1)	.541	.281	3.705	1	.049	1.718
	loss_of_parent(1)	.454	.211	4.603	1	.032	1.574
	spirirtual_consult(1)	-.562	.227	6.126	1	.013	.570
	Agecode			46.489	2	.000	
	agecode(1)	-2.182	.383	32.415	1	.000	.113
	agecode(2)	-1.898	.290	42.925	1	.000	.150
	Constant	.883	.365	5.863	1	.015	2.417

LR=103.222, df=4, Pvalue=0.00001